LETTER TO THE EDITOR
DOI: 10.4274/tjh.galenos.2026.56056

Early T-Cell Precursor Acute Lymphoblastic Leukemia Harboring a *CEBPA* Mutation in an Adult Patient

Bing Liu[1], Ting Li[2] , Fang Long[3]
[1]The Affiliated Cancer Hospital of Zhengzhou University & Henan Cancer Hospital, Department of Laboratory Medicine, Zhengzhou, China
[2]Beijing Lu Daopei Hospital, Department of Laboratory Medicine, Beijing, China
[3]Sichuan Provincial Women's and Children's Hospital/The Affiliated Women's and Children's Hospital of Chengdu Medical College, Department of Clinical Laboratory, Chengdu, China

Fang Long, M.D., Sichuan Provincial Women's and Children's Hospital/The Affiliated Women's and Children's Hospital of Chengdu Medical College, Department of Clinical Laboratory, Chengdu, China
xiaolfran@163.com
https://orcid.org/0000-0001-7429-1996

August 28, 2026
November 9, 2026

To the Editor,

A 52-year-old man was admitted for evaluation of abnormal blood counts persisting for more than two months. Computed tomography revealed mildly enlarged lymph nodes in the bilateral supraclavicular regions, axillae, and mediastinum. Bone marrow aspirate examination showed 88% blasts. The blasts were medium to large, with round to oval nuclei, finely dispersed chromatin, and one or more prominent nucleoli. The cytoplasm was moderately abundant and pale blue, with scattered fine granules and occasional vacuole-like structures (Figure 1A). No Auer rods were identified. Flow cytometry identified a blast population with early T-cell precursor acute lymphoblastic leukemia (ETP-ALL) immunophenotype: $CD117^+$ $CD7^+$ $HLA\text{-}DR^+$ $CD33^+$ CD2 partial $^+$ CD38 partial$^+$ CD56 partial$^+$ cCD3 dim$^+$ CD13 dim$^+$ $CD34^-$ $CD3^-$ $CD4^-$ $CD8^-$ $CD19^-$ $CD22^-$ $cCD79a^-$ $cMPO^-$ $cTdT^-$ $CD1a^-$ (Figure.1B-L). Next-generation sequencing (NGS) was performed using a reagent kit independently developed in our laboratory. NGS identified an insertion variant in *CEBPA* (c.946_947insTGG; p.Leu315_Glu316insVal), with a variant allele frequency (VAF) of 84.96%, along with a concurrent *TP*53 mutation. Conventional cytogenetic analysis revealed a karyotype of 47,XY,+10[16]/46,XY[3]. Based on these findings, the patient was diagnosed with *CEBPA*-mutated ETP-ALL on November 3, 2025.

Induction therapy was initiated in November 2025 with a VA+VP regimen (azacitidine, venetoclax, vincristine, and prednisone). Three weeks after induction, bone marrow examination revealed 1.6%

uncorrected proof

immature lymphocytes, and flow cytometric minimal residual disease (MRD) assessment approximately five weeks after induction was negative, with a normal male karyotype (46,XY). Approximately six weeks after induction, the patient began sequential consolidation therapy with azacitidine plus venetoclax, followed approximately four weeks later by CAG combined with lisatoclax and prednisone. Subsequent regimens included decitabine combined with lisatoclax and prednisone (approximately six weeks later), a four-drug combination of lisatoclax, CAG, decitabine, and prednisone (approximately one month later), methotrexate (approximately five weeks later), and DCHG combined with lisatoclax and prednisone (approximately six weeks later). Following each treatment cycle, bone marrow cytomorphology, flow cytometric MRD, cerebrospinal fluid analysis, and molecular MRD testing for the *CEBPA* mutation remained negative, and the karyotype remained normal (46,XY). At the most recent follow-up in August 2026, approximately two months after completion of chemotherapy, the patient remained in complete remission without evidence of relapse. However, the relatively short post-treatment follow-up period precludes conclusions regarding the durability of remission, and continued long-term monitoring is warranted.

ETP-ALL is immunophenotypically defined by absent or dim CD5 expression, absence of CD1a and CD8, and expression of one or more myeloid- or stem cell-associated markers (e.g., CD117, CD34, CD13, CD33, or HLA-DR). The immunophenotypic findings in the present case fulfilled these diagnostic criteria. Distinguishing ETP-ALL from T/myeloid mixed-phenotype acute leukemia (MPAL) can be challenging as both entities may express myeloid- or stem cell-associated markers and show absent or dim CD5 expression. The key discriminator is myeloid-lineage assignment: T/myeloid MPAL requires demonstrable myeloid differentiation, established by MPO positivity or, in MPO-negative cases, evidence of monocytic differentiation. The intensity of cCD3 expression is likewise informative, since T-lineage assignment requires expression at an intensity comparable to that of normal mature T cells. In the present case, the blasts showed dim cCD3 expression and were MPO-negative, with no evidence of monocytic differentiation, supporting ETP-ALL rather than T/myeloid MPAL [1–2].

CEBPA mutations are well-established molecular abnormalities in acute myeloid leukemia (AML), occurring in approximately 5% of pediatric and 5–11% of adult AML cases [3]. Specific *CEBPA* mutations affecting the basic leucine zipper region confer favorable prognosis in AML and are recognized within the favorable-risk category of the 2022 European LeukemiaNet recommendations. However, these prognostic associations are AML-specific and cannot be directly extrapolated to T-ALL. The pathogenic and prognostic significance of *CEBPA* mutations in T-ALL remains poorly characterized, and clinical evidence in this setting is limited. Szmajda et al. reported significantly lower *CEBPA* mRNA expression in ALL compared with AML, with no significant association between expression level and ALL subtype, age, or white blood cell count [4]. These findings underscore the current gaps in understanding *CEBPA*'s role in ALL, but do not establish its prognostic relevance in this disease.

Cytoplasmic granulation has been described in lymphoblasts in a small subset of ALL cases, occurring in approximately 2%–7% of pediatric cases and predominantly affecting B-lineage disease. [5–6]. By contrast, *CEBPA* alterations are exceedingly rare in ALL, with reported cases largely limited to *IGH*::*CEBPA* fusions in B-ALL, particularly among adolescents and young adults. To our knowledge, a *CEBPA* mutation has not previously been reported in ETP-ALL, making the present case a potentially novel addition to the molecular spectrum of this disease.

In summary, we report an adult case of ETP-ALL harboring a *CEBPA* mutation. This case

uncorrected proof

broadens the spectrum of molecular abnormalities observed in ETP-ALL and highlights the diagnostic challenges posed by its immunophenotypic overlap with MPAL. It also underscores the importance of integrating morphologic, immunophenotypic, cytogenetic, and molecular findings to establish an accurate diagnosis and avoid inappropriate lineage assignment. Further studies are needed to clarify the biological and prognostic significance of *CEBPA* mutations in T-ALL.

Keywords: Early T-cell precursor acute lymphoblastic leukemia, CEBPA mutation, Flow cytometry, morphology

Data availability statement
Data sharing is not applicable to this article.

Funding statement
None.

Conflict of interest disclosure
The authors declare that no one has conflict of interest potentially related to this manuscript.

Ethics approval statement
As this manuscript presents a single case report and formal ethics committee approval was not required

Patient consent statement
Informed consent was obtained from this patient.

Consent for publication Informed consent was obtained from the publication.

References

1. Buckley M, Yeung DT, White DL, Eadie LN. T-cell acute lymphoblastic leukaemia: subtype prevalence, clinical outcome, and emerging targeted treatments. Leukemia. 2025;39(6):1294-1310.
2. Xu K, Maharaj C, Kaffo E, Vitsaras E, Orfinada K, Baker R, et al. Diagnosis and treatment of early T-cell precursor acute lymphoblastic leukaemia. Br J Haematol. 2025;207(2):674-677.
3. DiNardo CD, Erba HP, Freeman SD, Wei AH. Acute myeloid leukaemia. Lancet. 2023;401(10393):2073-2086.
4. Szmajda D, Krygier A, Jamroziak K, Żebrowska-Nawrocka M, Balcerczak E. Expression level of CEBPA gene in acute lymphoblastic leukemia individuals. Sci Rep. 2019;9(1):15640.
5. Zhang J, Li M, He Y. Granular B-lineage acute lymphoblastic leukaemia mimicking acute myeloid leukaemia. Br J Haematol. 2019;184(6):894
6. Pitman SD, Huang Q. Granular acute lymphoblastic leukemia: a case report and literature review. Am J Hematol. 2007 ;82(9):834-7.

uncorrected proof

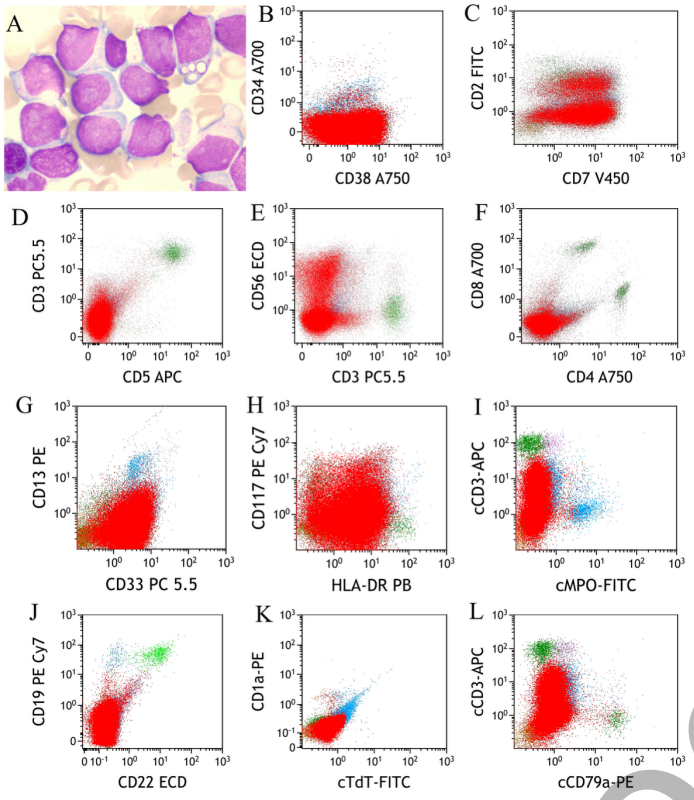


Figure 1. Bone marrow aspirate examination revealed 88% blasts. The blasts were medium to large in size, with round to oval nuclei containing finely dispersed chromatin and one to several prominent nucleoli. The cytoplasm was moderately abundant and pale blue, with scattered fine granules and occasional vacuole-like structures (A; original magnification ×1000). Flow cytometric analysis identified a blast population with an immunophenotype consistent with early T-cell precursor acute lymphoblastic leukemia (ETP-ALL): CD117^{+}, CD7^{+}, HLA-DR^{+}, CD33^{+}, partial expression of CD2, CD38, and CD56, dim expression of cCD3 and CD13, and absence of CD34, surface CD3, CD4, CD8, CD19, CD22, cCD79a, cMPO, cTdT, and CD1a (highlighted in red, B-L).

uncorrected proof